Lead and Copper Rule Revisions:

Guidance for Developing and Maintaining a Service Line Inventory

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October 13, 2022

Office of Drinking Water
Safe Drinking Water for a Healthy Virginia

VDH VIRGINIA DEPARTMENT OF HEALTH
Protecting You and Your Environment

While we wait to begin…

- Please type in the chat:

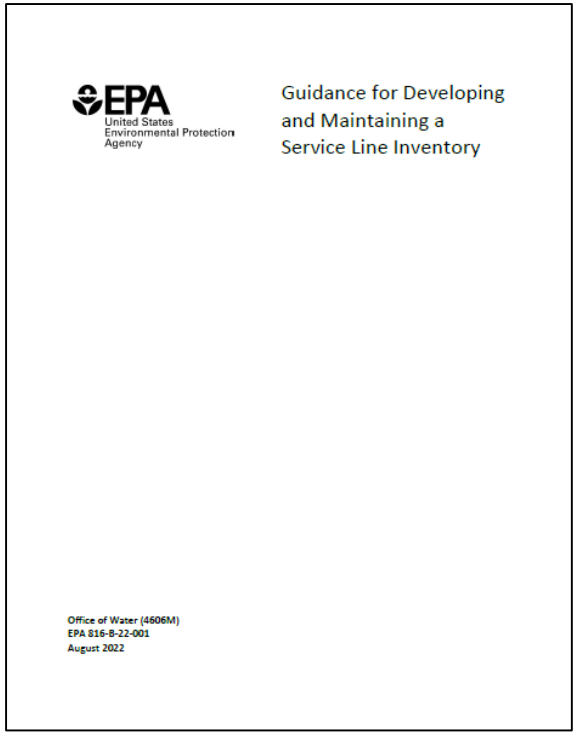
- Your organization
- Your position
- Your role in Service Line Inventory activities

Lead and Copper Rule Revisions (LCRR)

- **Purpose of presentation**
  - Identify the regulatory requirements associated with the Lead Service Line (LSL) Inventory
  - Excerpts from the USEPA's "Guidance for Developing and Maintaining a Service Line Inventory"

Guidance Document Topics

- Benefits of a service line materials inventory
- Summary of LCRR inventory requirements
- Inventory elements
- Inventory planning
- Historical records review
- Service line investigation methods
- Developing and updating the inventory
- Public accessibility
- Appendix featuring case studies and more



Key Points to Remember

LCRR Requirements

- All CWSs and NTNCWSs must develop an inventory of service lines that meets the LCRR requirements, including service line materials classification, information sources, and public accessibility (40 CFR § 141.84(a)).
- Water systems must submit their initial inventories to their state by October 16, 2024 (40 CFR § 141.84(a)(1)) and 141.90(e)(1)).
- All CWSs and NTNCWSs must notify all persons served by the water system at the service connection with a lead, GRR, or lead status unknown service line within 30 days of completing their service line inventory (40 CFR § 141.85(e)).
- All LCRR requirements other than the initial inventory requirements are subject to change under the LCRI.

Recommendations (Not Required under the LCRR)

- Water systems should not wait until their inventories are complete to begin conducting LSLR. Replacing LSLs while developing the inventory may create synergies or introduce opportunities for cost-savings.

Guidance for Developing and Maintaining a Service Line Inventory, Page 1-10

The Benefits of a Comprehensive and Accurate Inventory (1.1)

Improved asset management

- Allows for management and planning for maintenance and replacement of service lines, meters, and associated utility-owned infrastructure

Facilitate LSL Replacement programs - Regulatory

- Facilitates required LSL Replacement – Trigger level and Action Level exceedance
- Can be used in applications for external LSLR funding
- Increase LSLR programs efficiency, stretching the value of internal or external funding
- Enables prioritization of underserved communities for LSLR

Improve public health – Regulatory Public Notifications

- Allows for notification to customers about lead sources in drinking water infrastructure so they can take action to reduce their risk of exposure
- Allows for mitigation of exposure risk after disturbance of a known or potential lead service line (LSL) or galvanized requiring replacement (GRR) service line

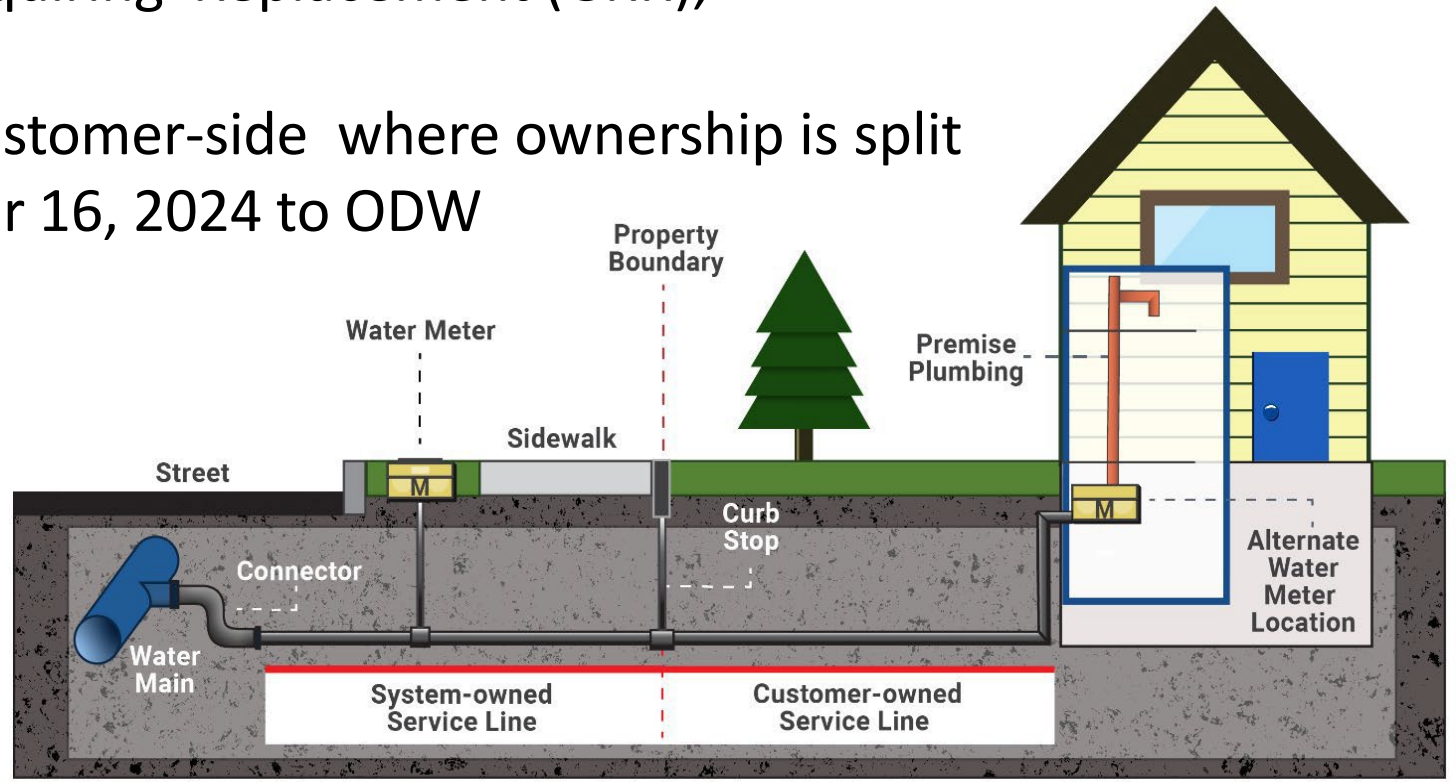
Engage the community

- Builds customer transparency
- Showcase progress of LSLR program
- Opportunity to educate and involve customers, which can create opportunities for LSLR

Inventory Requirements Overview (1.3.1)

All Community and NTNC Waterworks must develop an inventory:

- Identify materials of service lines
- Include **all service lines**, regardless of the actual or intended use
- Classify as: Lead, Galvanized Requiring Replacement (GRR), Unknown, Non-Lead
- Include both the system- and customer-side where ownership is split
- Submit the inventory by October 16, 2024 to ODW



Guidance for Developing and Maintaining a Service Line Inventory, Page 2-4

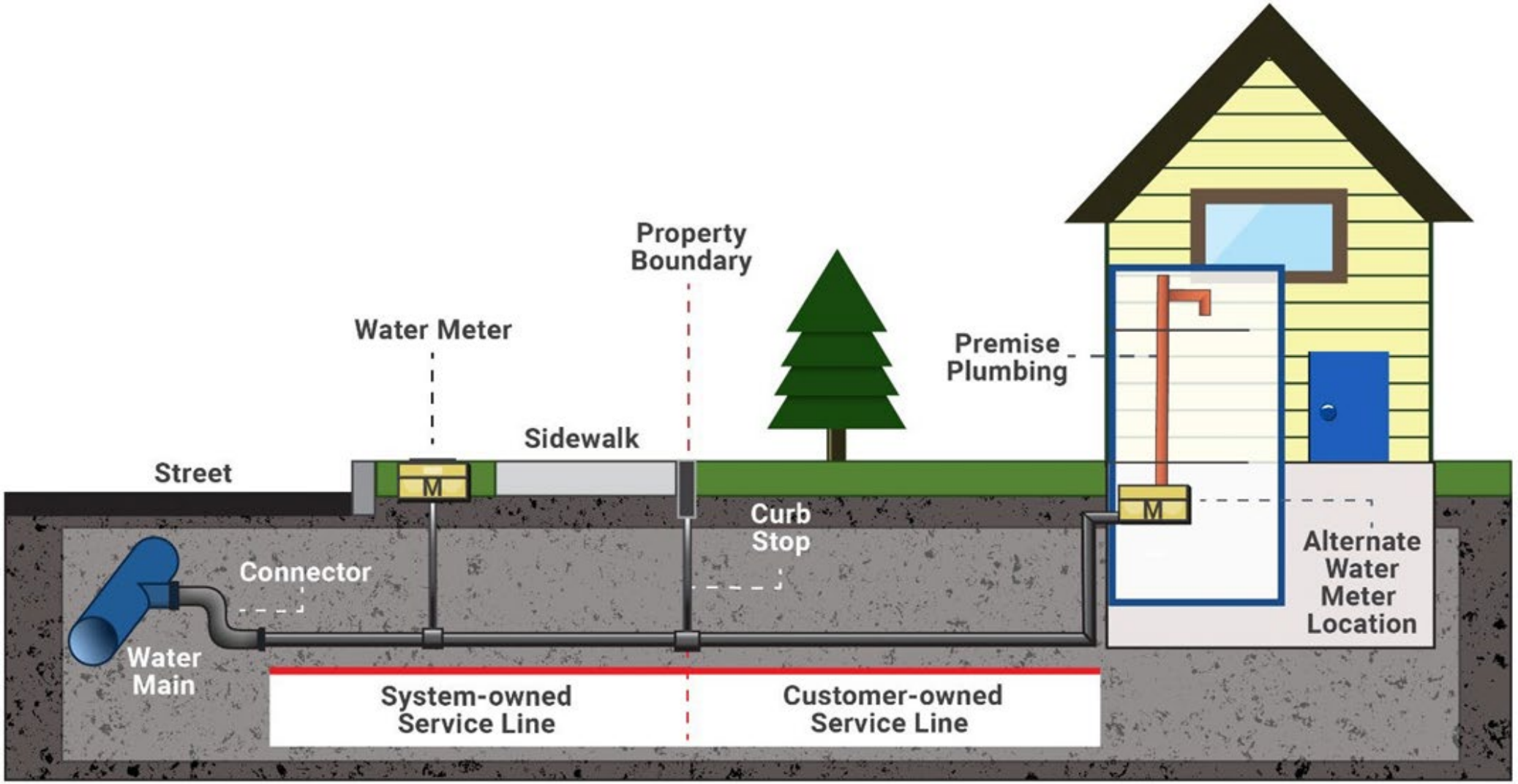
Material Classifications (2.1.1)

LEAD

The service line is made of lead (40 CFR §141.84(a)(4)(i)).

***Keep in Mind**:*

- The LCRR updates the definition of a lead service line (LSL) as “a portion of pipe that is made of lead, which connects the water main to the building inlet” (40 CFR §141.2).
- Lead-lined galvanized service line is considered a LSL.
- If the only lead pipe serving the building is a lead gooseneck, pigtail, or connector, the service line is **not** considered an LSL under the initial inventory requirements of the LCRR.
- EPA recommends that the system track the material of all components that potentially contain lead, including connectors



Guidance for Developing and Maintaining a Service Line Inventory, Page 2-4

Material Classifications (2.1.1)

Galvanized Requiring Replacement (GRR)

The galvanized service line is or ever was at any time downstream of an LSL or is currently downstream of a lead status unknown service line. If the water system is unable to demonstrate that the galvanized service line was never downstream of an LSL, it must presume there was an upstream LSL (40 CFR §141.84(a)(4)(ii)).

Why:

- Galvanized service lines that are or ever were downstream from an LSL can adsorb lead and contribute to lead in drinking water.

Examples:

- The customer-owned portion from the meter to the building is galvanized, and the system-owned portion from the water main to the meter was previously lead but has been replaced. The customer-owned portion of the service line would be GRR.
- A water system has no records for a service line. It finds copper on the system-owned side, which is a replacement of unknown service line. It finds galvanized on the customer-owned side. The customer-owned portion of the service line would be GRR.
- Lead gooseneck, pigtail or lead connector does not trigger a GRR.

Material Classifications (2.1.1)

Non-Lead

The service line is determined through an **evidence-based record, method, or technique that it is not lead or GRR** (40 CFR §141.84(a)(4)(iii)).

Keep in Mind:

- If a system can demonstrate that a galvanized service line was never downstream of an LSL, it may be classified as non-lead.
- The term “non-lead” refers to the service line material only and does not include other potential lead sources present in solder, connectors, and other plumbing materials.
- The water system may classify the actual material of the service line (for example, galvanized, plastic, or copper) as an alternative to classifying it as non-lead.
- Tracking actual materials improves the usefulness of the inventory as an asset management tool.

Material Classifications (2.1.1)

Lead Status Unknown or Unknown

The service line material is not known to be a lead, GRR, or non-LSL, such as where there is **no documented evidence supporting material classification** (40 CFR §141.84(a)(4)(iv)).

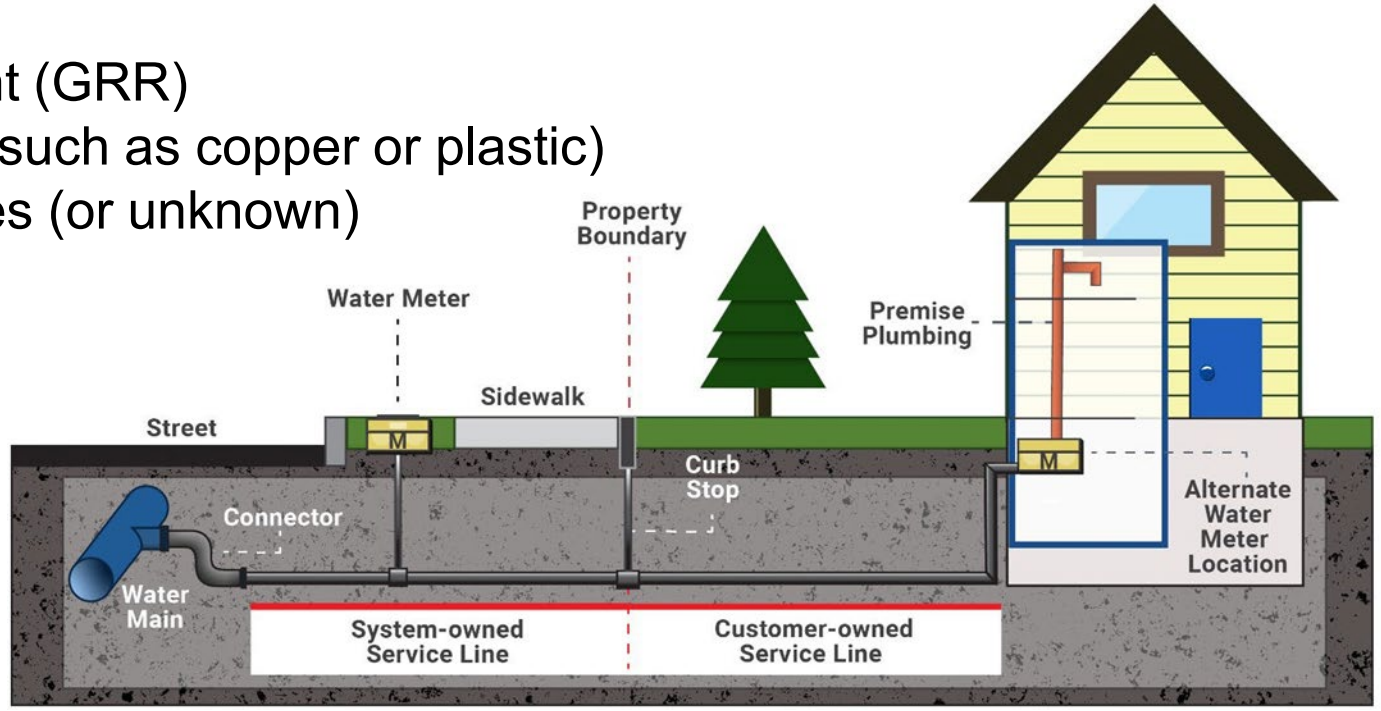
Keep in Mind:

- Installation date after the lead ban is documented evidence.
- Water systems may elect to provide more information regarding their unknown lines as long as the inventory clearly distinguishes unknown service lines from those where the material has been determined through records or inspections (40 CFR §141.84(a)(4)(iv)).

Material Classifications (2.1.1)

Must use one of the four classifications for the entire line considering:

- Water system-owned portion
- Customer-owned portion
  1. Lead
  2. Galvanized requiring replacement (GRR)
  3. Non-lead (or the actual material, such as copper or plastic)
  4. Lead status unknown service lines (or unknown)



Classifying Service Line Materials When Ownership is Split According to the LCRR (2.1.1)

System-Owned Portion	Customer-Owned Portion	Classification for Entire Service Line
Lead	Lead	Lead
Lead	Galvanized Requiring Replacement	Lead
Lead	Non-lead	Lead
Lead	Lead Status Unknown	Lead
Non-lead	Lead	Lead
Non-lead and never previously lead	Non-lead, specifically galvanized pipe material	Non-lead
Non-lead	Non-lead, material other than galvanized	Non-lead
Non-lead	Lead Status Unknown	Lead Status Unknown
Non-lead, but system is unable to demonstrate it was not previously Lead	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Lead	Lead
Lead Status Unknown	Galvanized Requiring Replacement	Galvanized Requiring Replacement
Lead Status Unknown	Non-lead	Lead Status Unknown
Lead Status Unknown	Lead Status Unknown	Lead Status Unknown

Exhibit 2-3:Classifying Service Line Materials When Ownership is Split According to the LCRR 40 CFR §141.84(a)(4)

Recommended Subclassification and Additional Information (2.1.2)

- Lead Status Unknown – “LSL Likelihood” - High, medium low – can used the following to assign likelihood:
  - Predictive model
  - Historical records

    Tracking this information could be helpful to focus proactive inventory investigations and LSL replacement efforts.
- GRR – subclassifications:
  1. Currently downstream of an LSL
  2. Previously downstream of an LSL
  3. Unable to demonstrate never downstream of an LSL

Recommended Subclassification and Additional Information (2.1.2)

- Lead-lined galvanized pipe
  - Meets the definition of an LSL
  - Difficult to identify visually
  - Consider any available information that indicates if used
  - Service line sampling may be necessary
- Actual Materials for Non-Lead
  - Galvanized
  - Copper
  - Plastic
  - Track actual material internally and/or part of the publicly accessible inventory

Material Classification

1. What are the four service line material classifications mandated by the LCRR?

Lead, Galvanized Requiring Replacement (GRR), Unknown, Non-Lead

2. What must be classified?

Water system-owned portion, Customer-owned portion, Entire service line (one classification)

Other lead containing items (2.1.3)

Recommended tracking in inventory:

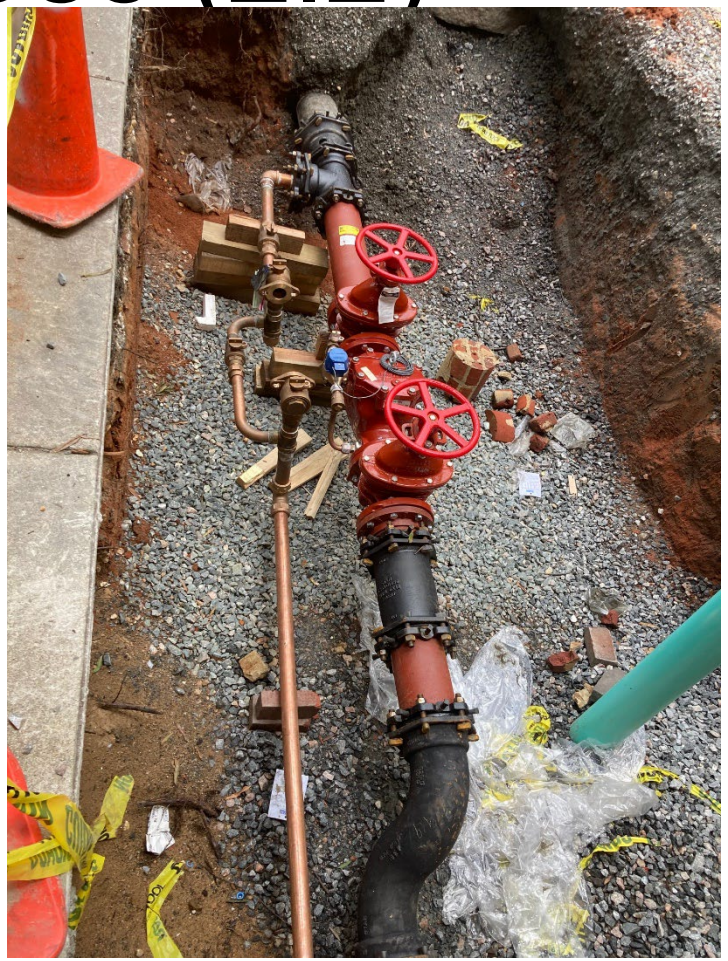
- Goosenecks, Pigtails and Connectors – materials and locations
- Lead Solder – if used in service line
- Fittings and Equipment on SL – Curb stops and meters before the Reduction of Lead in Drinking Water Act (January 4, 2014)

https://www.epa.gov/sites/production/files/2019-03/documents/lead_fact_sheet_and_case_studies_final.pdf

Include All Service Lines Regardless of Ownership and Intended Use (2.2)

- **All service lines** connected to the distribution system
- Regardless of ownership
- Where the ownership is shared, include both the water system and the customer owned portions
- Track the address location of each service line
- Track material classification
- Track regardless of use
- Include fire service lines, irrigation service lines
- Include SLs to vacant and abandoned buildings

 # Customer Accounts ≠ # Service Connections



Recommendations (2.2)

- Document Waterworks ownership and point where the customer responsibility begins
  - Will be helpful when discussing LSL replacements with customers
- Vacant or abandoned buildings
  - Turn off water
  - Prioritize occupied homes for SL investigation
  - Investigate if doing work in the area
  - Identify SL material before service is restored
  - Don’t reuse or reconnect LSLs on previously vacant or teardown/reconstruction buildings
  - Trigger SL investigation and LSLR by transfer of property

Location Identifiers (2.3)

Required:

- The water system must create and maintain an inventory that includes the exact address associated with each service line connected to the public water system. (40 CFR §141.84(a)).
- Publicly available inventory includes a location identifier for any **lead** or **GRR** service lines.
- Possible location identifiers:
  - Street address, intersection, landmark, block, GPS coordinates, etc.
  - Not overly broad (zip code, census tract)

Location Identifiers (2.3.2)
Publicly Available Inventories

Recommendations:

- Include a location identifier for **all** service line materials.
  - Publish locations of all service lines along with materials
- Consider publishing addresses
  - Street addresses give the most transparency and consumer awareness
- Additional descriptors when multiple service lines serve the same address

Location Identifiers

1. Inventory must include the exact address of all service lines. (True or False)

   True

2. Publicly available inventory must provide location identifier for all **Lead and Galvanized Requiring Replacement** service lines. (True or False)

   True

3. What are possible location identifiers for the publicly available inventory?

Street address, intersection, landmark, block, GPS coordinates

Service Line Characteristics (2.4)

Recommendations:

Service Line Inventory to include:

- Sources of information for each service line
- Pipe diameter
- Installation date

Developing an Inventory
Required Historical Records Review (4)

❑Previous Materials Evaluation (4.1)

Water systems must use the information on lead and galvanized iron or steel that it identified under 40 CFR § 141.42(d) when conducting the inventory of service lines in its distribution system for the initial inventory (40 CFR §141.84(a)(3)).

- **Special monitoring for corrosivity characteristics** in the 1980s asked systems to identify lead, copper, ferrous and galvanized piping present in the distribution system.
- **LCR material surveys**

Developing an Inventory
Required Historical Records Review

❑Construction and Plumbing Codes and Records (4.2)

All construction and plumbing codes, permits, and existing records or other documentation which indicates the service line materials used to connect structures to the distribution system (40 CFR §141.84(a)(3)(i)).

- Identify when LSLs were allowed/specified or banned from use.
- Identify service areas most likely to have LSLs by home/building construction date and service line size.
- Review construction and plumbing permits for identification of service line (customer and/or system-owned) plumbing materials.

Virginia Lead Chronology

Effective Date	Description
September 1, 1973	Virginia Uniform Statewide Building Code (USBC) adopted. Some localities granted an extension to September 1, 1975. Allowed lead water service lines.
August 1, 1978	USBC: Lead water service pipe not allowed.
July 16, 1982	USBC included grace period language connecting permit date or design date to the USBC edition.
April 1, 1986	USBC: limits solder and flux to no more than 0.2% lead in water service or water distribution piping.
June 19, 1988	Federal Lead Ban prohibits use of pipes, solder or flux not “lead free”. “Lead free” was defined as solder and flux with no more than 0.2% lead and pipes with no more than 8% lead. Enacted by Congress June 19, 1986. Enforcement began 24 months from enactment.
March 1, 1991	USBC limited water pipes to 8% lead. This included all water service pipe, water distribution pipe, fittings, valves and faucets.

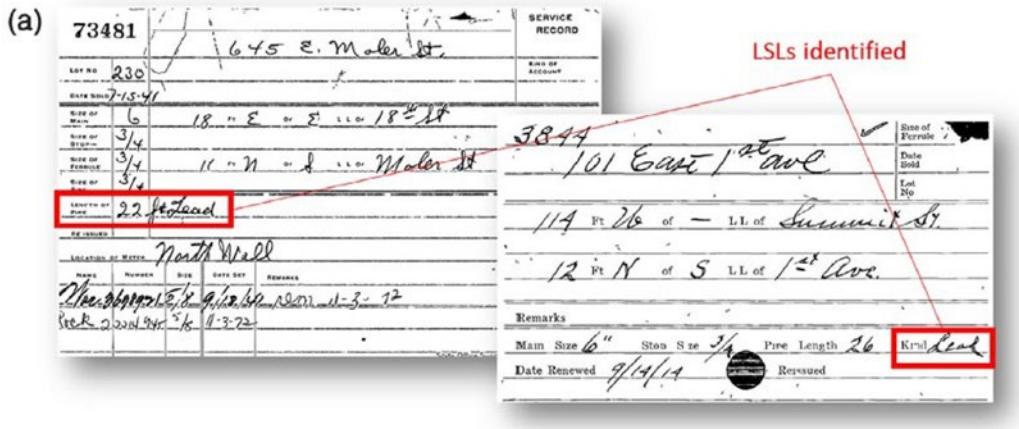
1. USBC applies to service pipes and premise plumbing. Likely this applies only to the private portion of the service pipe.
2. USBC does not apply to or address goosenecks on the utility side.
3. Federal Lead Ban applies to waterworks, service pipes, and premise plumbing.
4. Dates in Appendix D of the Guidance are wrong.

Developing an Inventory Required Historical Records Review

- **Water System Records (4.3)**

  All water system records, including distribution system maps and drawings, historical records on each service connection, meter installation records, historical capital improvement or master plans, and standard operating procedures (40 CFR §141.84(a)(3)(ii)).

- Identify service line material for system-owned and customer-owned sides.



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Developing an Inventory
Required Historical Records Review

❑ Water System Records (4.4)

All inspections and records of the distribution system that indicate material composition of the service connections that connect a structure to the distribution system (40 CFR §141.84(a)(3)(iii)).

- Identify service line material for system-owned and customer-owned sides.
- Verify construction and water system records.

Developing an Inventory
Required Historical Records Review

- **State Requirements (6.1.1)**

  Any resource, information, or identification method provided or required by the state to assess service line materials, to identify service line materials for the initial inventory (40 CFR §141.84(a)(3)(iv)).

- Identify service line material for system-owned and customer-owned sides.

ODW requires:

- Most recent approved LCR material survey
- Lead Ban Guidance and Chronology (posted on ODW's website)

Ongoing Updating Required (3.4)

- Systems must identify and track information on service line material as they are encountered in the course of normal operations (*e.g.,* checking service line materials when reading water meters or performing maintenance activities) (40 CFR §141.84(a)(5)).
- Systems must update the inventory based on all applicable sources and any lead service line replacements or service line material inspections that may have been conducted (40 CFR §141.84(a)(6)).

https://www.vwd.org/i-want-to/water-meters

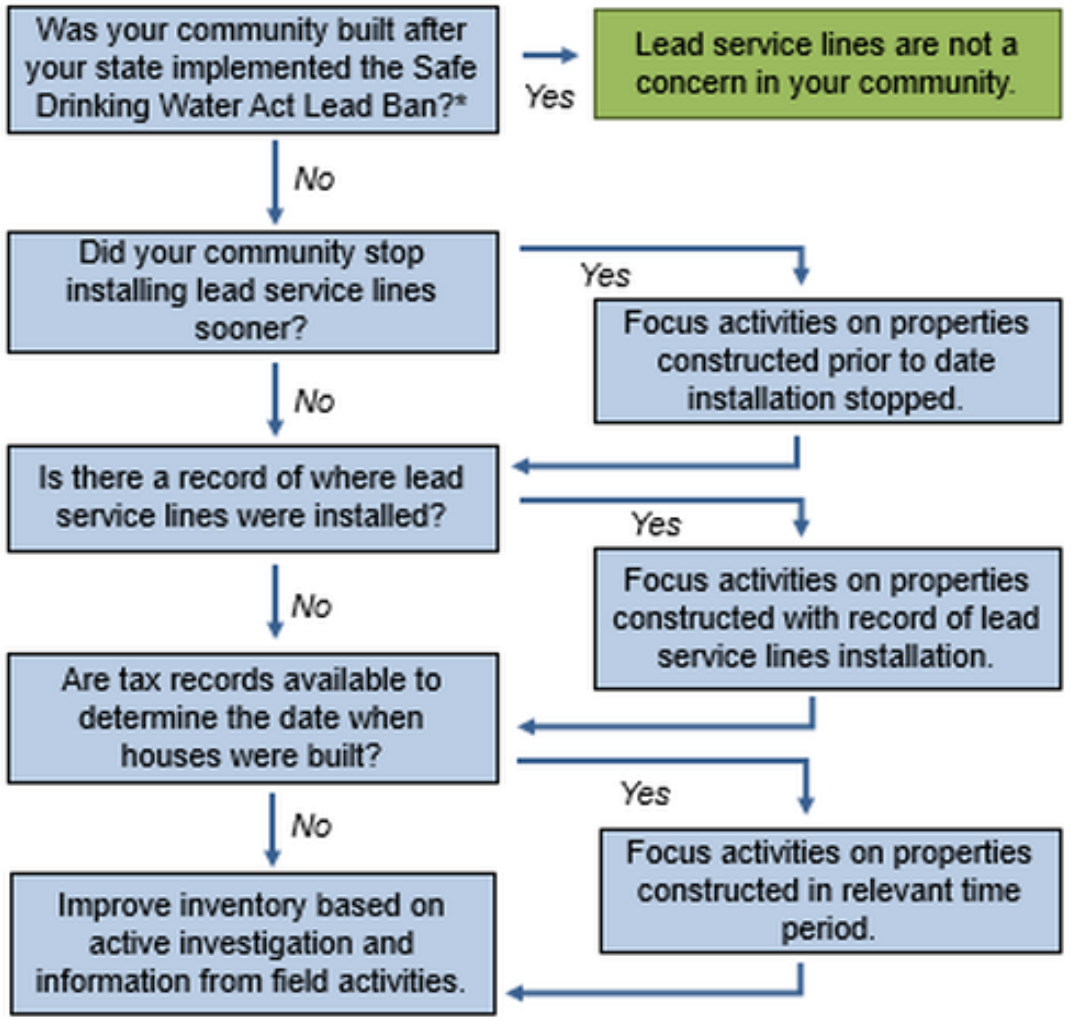
Developing an Inventory Recommended Approach

- Identify Staff and Resources (3.2)
  - Level of effort depends on system size, historical records, LSL investigation methods, etc.
  - Significant effort to digitize paper records
  - Significant effort to engage customers
  - Interview experienced staff, plumbers
    - Classification of service line materials based on interviews should not be used as a sole source of information
    - Neighboring water systems – regional practices

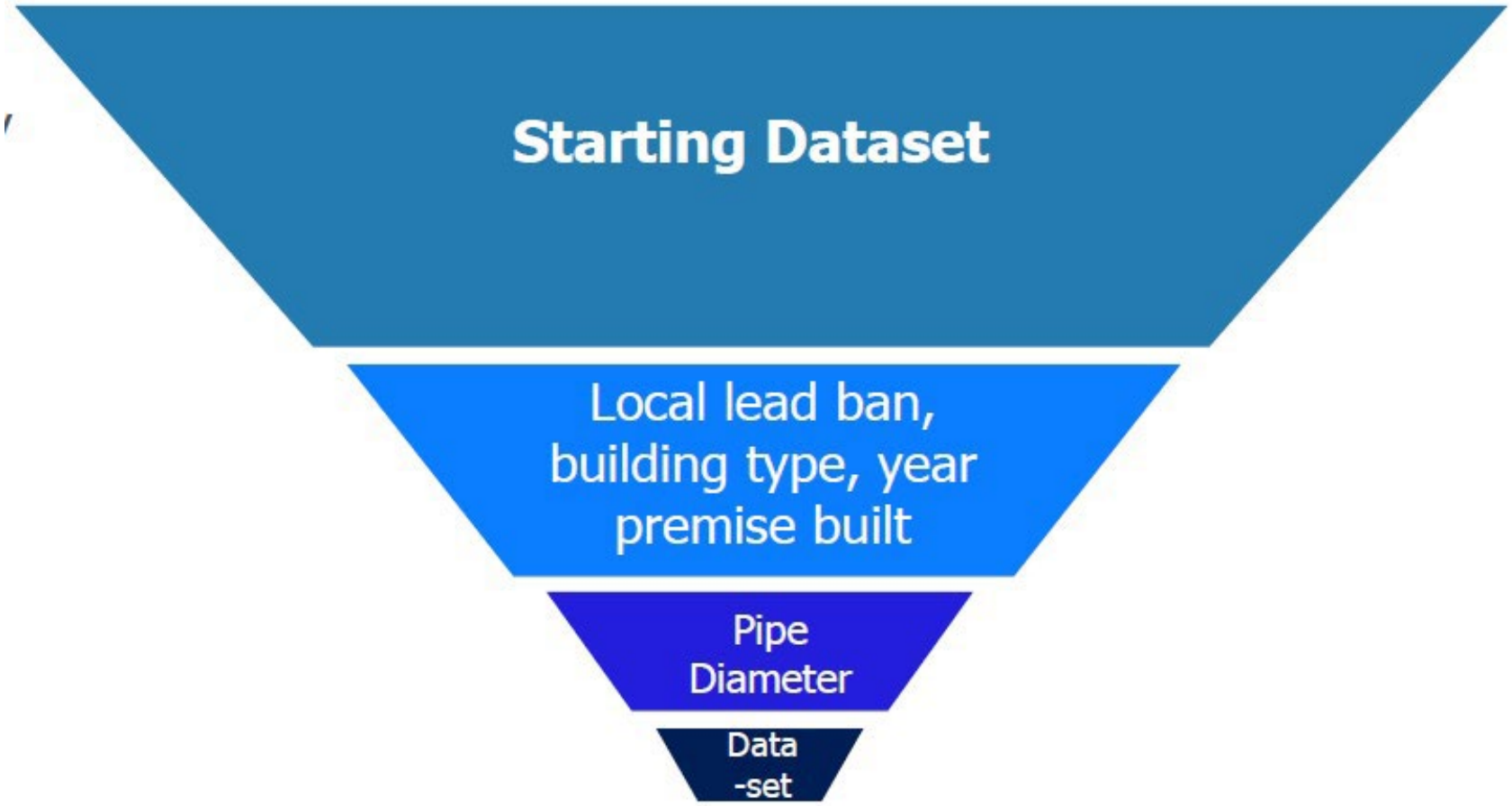
Developing an Inventory: Selecting an Inventory Format (3.3)

Keep in mind:

- EPA has no specific format requirement
- Updates are required
- Tracking information recommended as best practice
- ODW spreadsheet template – required for reporting
- EPA Template
- Custom spreadsheet or database
- Data migration into the ODW template

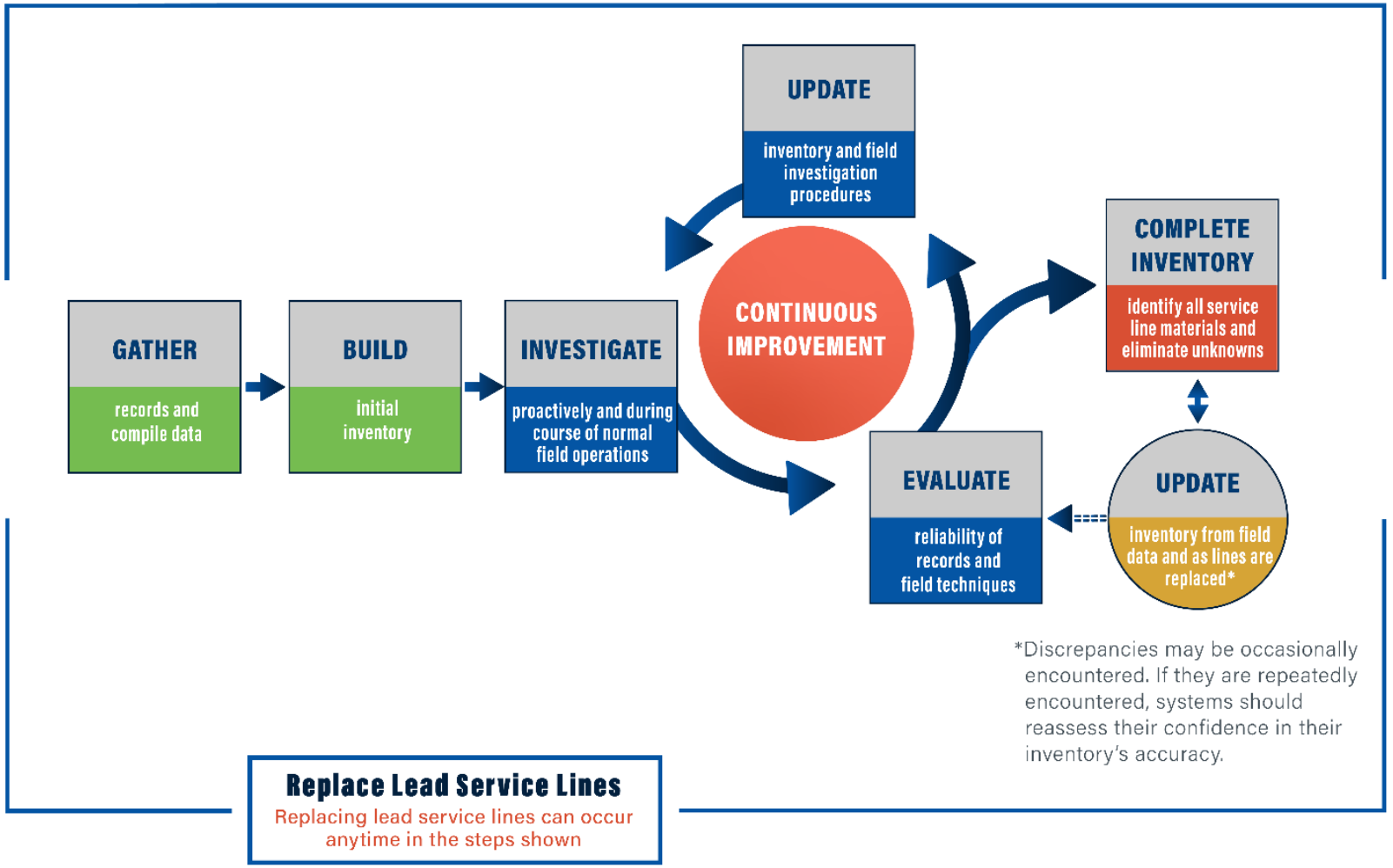


LSLR Collaborative Website: Preparing an Inventory: Where do we Start?



Source: Liggett, 2021 (April 2021 webinar slides)

Developing an Inventory



Service Line Investigation (5)

Identification methods provided or required by their state under the LCRR (40 CFR §141.84(a)(3)(iv)).

VDH ODW is allowing the following identification methods:

- Visual inspection of service line material, including at meter setting and inside home/building, customer self-identification, CCTV inspection, scratch test, lead solder test kit
- Excavation – Vacuum and Mechanical

VDH ODW will accept the following identification methods on a case by case basis (approval is required):

- Water quality sampling
- Predictive modeling
- Emerging methods
- Other methods

Comparison of Service Line Identification Techniques (5.4)

	Utility cost			Disturbance		Impact on resident			Utility skills required		Overall	
LSL ID method	Financial	Onsite time	Pre-/ post-time	Service line	Traffic flow	Water service disruption	Property damage	Resident involvement (includes pre-/post-time)	Technical interpretation	Labor	Time	Accuracy
Community records review	L or M (if digitized)	NA	M to H (L if digitized)	None	None	None	None	None	L to M	None	M	L to H
Basic/visual observations (on private side)	L	L	L to M	None	None	None	None	L	L	L	L	M to H
Water quality sampling—flushed	L	L	M to H	None	None	None	None	L	M	L	M	L to M
Water quality sampling—sequential	M	L	M to H	None	None	M	None	M to H	M	L to M	M	L to H
Water quality sampling—targeted	L	L	M to H	None	None	M	None	M to H	M	L to M	M	M
Excavation—mechanical	H	H	M to H	H	M to H	H	H	L	L to M	H	H	H
Excavation—vacuum	M to H	L to M	M to H	M	L to M	M to H	M to H	L	M	M to H	M	M to H

L = Low
M = Medium
H = High

Hensley et al., 2021 (Table 2)

Prioritizing Field Investigations (6.2)

Recommendations

Systems should investigate Unknown SLs:

- Before submitting the LSL Inventory
- To reduce the number of Unknowns
- To reduce regulatory burden related to Unknowns after October 16, 2024
- To reduce impact from customer notifications due to unknowns

Base extent of field investigations on:

- Completeness of historical records
- Confidence in the accuracy of historical records
- Other field work such as meter replacement
- Previous service line investigations
- Number of unknowns
- Vulnerable or environmental justice populations
- Disadvantaged community or neighborhood

Submitting the Initial Service Line Inventory (6.4)

Requirements:

- Submit by October 16, 2024
- System- and customer-owned portions of all service lines
- Classify each service line or portion of the service line
  - Lead, GRR, Non-lead, or Lead status unknown

Virginia is working on a method for electronic submittal of inventories – more to come.

Submitting the Initial Service Line Inventory (6.4)

EPA Identifies Best Practices:

- Complete the following tabs in the Inventory Template and in Appendix A:
  - PWS Information
  - Inventory Methodology
  - Inventory Summary
  - Public Accessibility Documentation
- See *Appendix A – State Checklist for Initial Inventory Submittal*

Virginia is working on procedures for submission of LSL Inventories – more to come

Inventory Updates (6.6)

Waterworks will wish to update to reflect:

- Investigation of unknowns
- Confirm/update material classifications
- LSL Replacements

Update based on required elements and new information

Waterworks must submit updates to the initial inventory:

- On the same schedule as LSL tap sampling
- No more frequently than annually
- Submit within 30 days of the end of the tap sampling monitoring period

Consider updating publicly accessible inventory in real-time

Service Line Inventory

1. Virginia will provide a method for electronic submission of Service Line Inventories, including a template. (True or False)

   True

2. Waterworks may submit a certification statement if they have no lead service lines instead of submitting a service line inventory. (True or False)

   False

3. The LCRR mandates tracking data and inventory updates, such as when LSLs are replaced or LSLs are discovered. (True or False)

   True

Systems with Only Non-Lead Service Lines (6.3)

Requirements for Systems with no Lead, Galvanized Requiring Replacement or Unknown Service Lines:

- Develop an initial inventory
  - Include all service connections
  - Use all required sources of information
  - Investigate and classify all Unknowns
- Submit the initial inventory by October 16, 2024
- Instead of a publicly accessible inventory, provide a written statement that the system has no LSLs or GRRs and a general description of methods used to make the determination to meet inventory public accessibility requirements of the LCRR (40 CFR §141.84(a)(9)).
- Include language in the CCR explaining how customers can access the inventory or provide a statement with the description of methods used to make the determination (40 CFR §141.153(d)(4)(xi)).
- Notify the state within 30 days and prepare an updated inventory on a schedule established by the state if the system subsequently finds an LSL or GRR service line (40 CFR §141.90(e)(3)(ii)).

Notification of LSL or Lead Status Unknown SLs (6.5)

After completing the initial inventory:

Notify customers served by LSLs, GRR and Unknown SLs within 30 days after completion of initial inventory

- Include:
  - Classification of service line material
  - Health effects of lead
  - Steps to minimize lead exposure in drinking water
- Notify new customers at the time of service initiation
- Repeat annually until no longer LSL, GRR or Unknown

Notification of LSL or Lead Status Unknown SLs

- **Confirmed LSLs**, the notification must also include information about opportunities to replace the LSL, any available financing programs, and statement that the system must replace its portion if the property owners notify the system that they are replacing their portion.
- **GRR,** the notification must also include information about opportunities for service line replacement.
- **Lead status unknown**, the notification must also include a statement that the service line is unknown but may be lead and information about opportunities to verify the material of the service line.

State Review of the Initial Inventory (6.7.1)

EPA expects states to review the initial inventory for compliance with LCRR requirements:

- Include all service lines
- Use and review all required sources of information
- Identify and track service line materials as encountered in the course of normal operations
- Categorize SLs as lead, GRR, non-lead, or lead status unknown

State Review of the Initial Inventory (6.7.1)

- A publicly accessible inventory must include location identifiers for each lead and GRR service line
- PWS with lead, GRR, or unknown SL must complete Consumer Notification within 30 days of completion of the initial inventory

State Review of the Initial Inventory (6.7.1)

Mismatch between Inventory requirements and review requirements

Required Inventory Submitted to States:

- Identify materials of service lines
- Include **all service lines**, regardless of the actual or intended use
- Classify as: Lead, Galvanized Requiring Replacement (GRR), Unknown, Non-Lead
- Include both the system- and customer-side where ownership is split
- Due by October 16, 2024

Review by States:

- Includes all service lines
- Use and review all required sources of information
- Identify and track service line materials as encountered in the course of normal operations
- Categorize SLs as lead, GRR, non-lead, or lead status unknown
- A publicly accessible inventory must include location identifiers for each lead and GRR service line
- PWS with lead, GRR, or unknown SL must complete Consumer Notification within 30 days of completion of the initial inventory

State Review of the Initial Inventory (6.7.1)

Mismatch between Inventory requirements and review requirements.

Conclusion: ODW will require PWS to provide information responsive to the checklist provided by EPA.

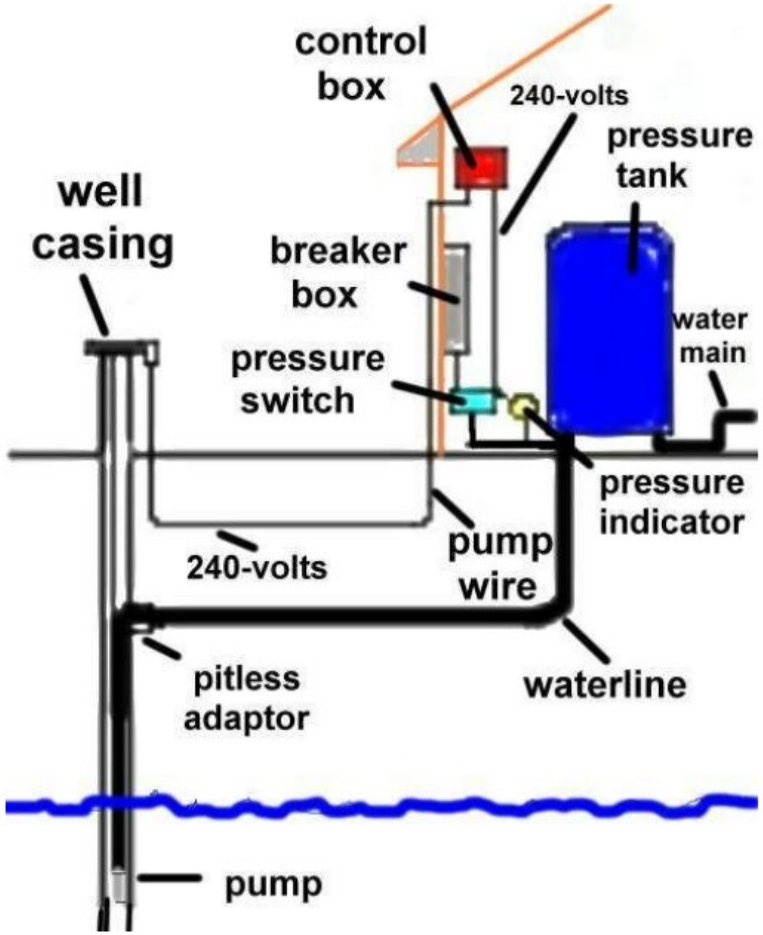
- PWS Information
- Inventory Methodology
- Inventory Summary
- Public Accessibility Documentation

Single Well - Single Building Systems

Direct connection from a well to a single building:

Report the material from the well to the building inlet for the inventory.

EPA intends to develop a separate guidance that is tailored to small CWSs and NTNCWSs.



https://www.pinterest.com/pin/374924737700645156/?mt=login

Page 2-9 – *Guidance for Developing and Maintaining a Service Line Inventory*

Inventory Public Accessibility (7)

Required (7.1.1):

- Service line inventory must be publicly accessible.
- Include a location identifier for each **LSL** and **GSR**.
- Location identifier is optional for **Unknown**
- Waterworks serving > 50,000 persons - publish online
- Waterworks with no **LSL, GSR, and Unknown** may use a written statement.
- CCR must include instructions to access the service line inventory.

Inventory Public Accessibility (7)

Recommendations (7.1.2):

- Include a location identifier for all service lines
- A street address as the location identifier
- Map or database searchable by street address or account
- Actual material for non-lead
- Summary of the total number of LSLs, GRRs, unknowns and non-lead
- Clear disclaimer language
- Instruction on how to read and interpret the inventory

Inventory Public Accessibility (7)

Recommendations (7.1.2):

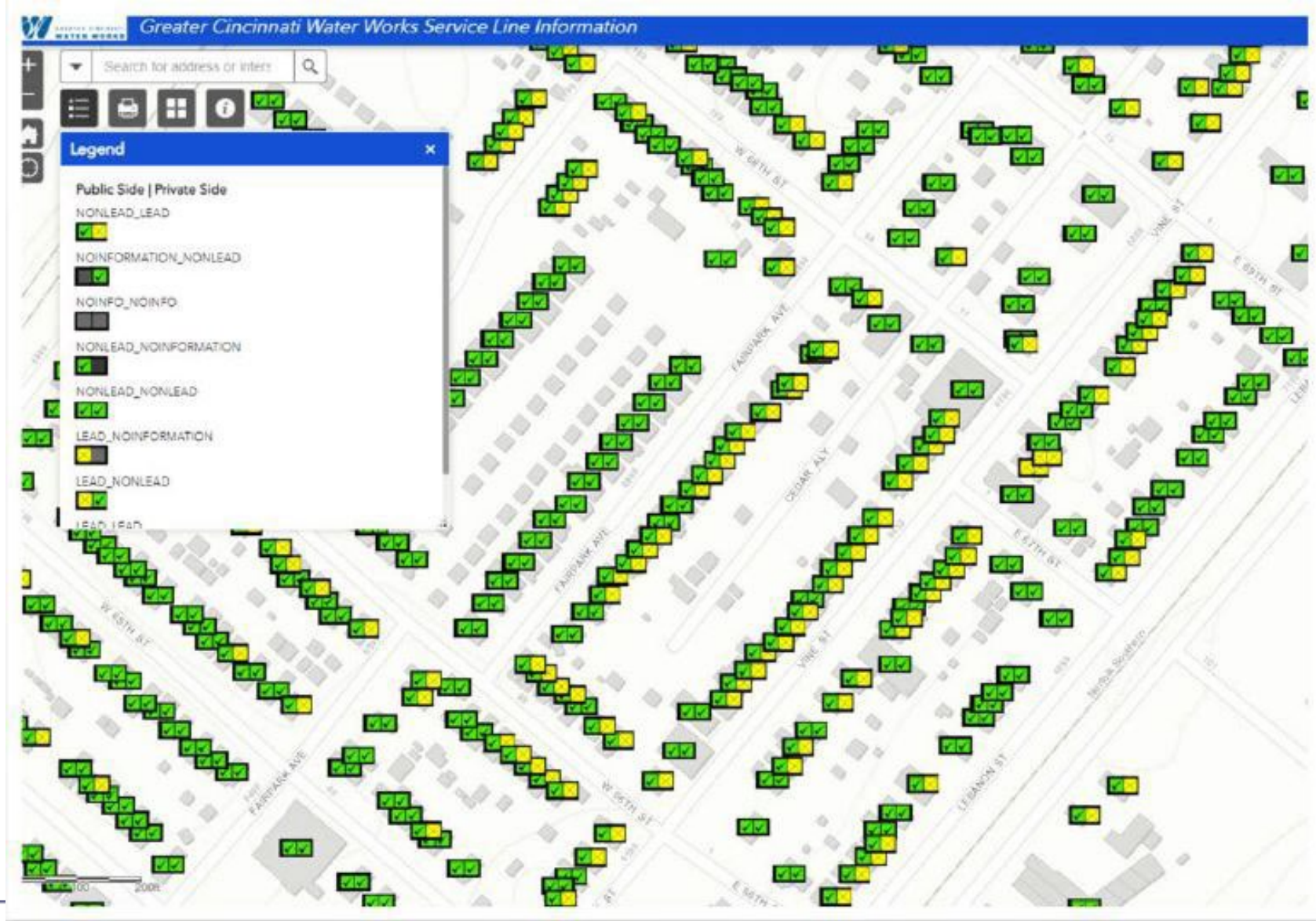
- Information on steps that consumers with LSLs can take
- Lead sources may exist in premise plumbing
- Schedule for investigating unknowns
- Information on actions to reduce lead
- Information about tap sampling
- Waterworks contact information

Making the Data Publicly Available (7.2)

Recommendations (7.2):

- Waterworks need to decide the best method
- Interactive online mapping application can be effective
  - Internet access, computer requirements, accessibility
- Printed service line or tabular data (non-web)
- Active community participating in inventory process
- Update inventory in real-time or as close as possible

Making the Data Publicly Available (7.2)



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Inventory Accessibility

1. All Community and NTNC waterworks must make the Service Line Inventory publicly accessible (True or False).

   True

2. All service connections must be shown on the publicly accessible Service Line Inventory (True or False).

   False – only Lead and GSR are required.

3. All Community and NTNC waterworks must publish the Service Line Inventory on the internet (True or False)

   False – only waterworks serving > 50,000 persons

Consumer Confidence Report (7.4)

Requirements:

- Statement that waterworks has prepared a service line inventory
- Instructions to access the service line inventory
- Systems with no Lead, GRR, or unknown service lines can instead provide a statement that they have no LSLs or GRRs with the description of methods used to make that determination.

Recommendation:

- Systems provide inventory related information in their CCR, regardless of any LCRI changes or requirements.

Questions?

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